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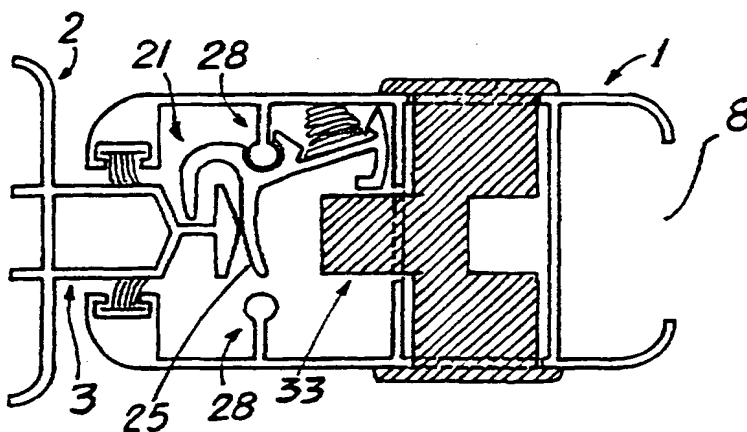
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(54) Title: LOCK ASSEMBLY FOR SLIDING DOOR/WINDOW PANELS



(57) Abstract: A lock is described for sliding aluminium door or window panels, wherein are used discrete hooking and locking mechanisms. The hooking mechanism comprises an oblong hook profile (21) which rotates automatically in a hooking or unhooking position into a vertically extending frame profile (1) which bears a respective recession shaping, as the sliding door/window panel is simply pulled in the opening or shutting direction, respectively. The locking mechanism operates so that, when being controlled by the user, it is set in a position for capturing the hooking mechanism in the hooking position, by capturing the immobilisation arm

of the above mentioned, otherwise freely and automatically rotating, oblong hook profile (21).

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## LOCK ASSEMBLY FOR SLIDING DOOR/WINDOW PANELS

5 ***The Technical Field***

The present invention refers to the field of the art of aluminium constructions in general and in particular to the field of lock manufacturing, proposing a lock for sliding aluminium door and/or window panels. The proposed  
10 lock comprises discrete, independent parts of a hooking mechanism with an oblong profile of an automatically revolving hook and a mechanism for locking the said revolving hook at the position wherein the sliding door/window panel locks.

15 ***Background of the invention***

A lock similar to that proposed by the present invention has not so far been proposed, designed, manufactured or made commercially available.

A large variety of locks are used with sliding door  
20 and window frames, aiming at locking the sliding door/window panel into a facing part located within the frame.

A most common type of frame amongst aluminium frames is that which in the region wherein the sliding  
25 door/window panel locks is provided with a protruding and vertically extending part of the frame profile which penetrates into a front opening of the vertically extending part of the profile of the sliding door/window panel, which consists of parallel walls and ends to a  
30 rear opening wherein a glass or shutter panel is fitted. An internal or external lock can be alternatively used with this type of frame/sliding panel profiles.

The internal lock has the form of a hook, pin, or other similar locking means which, when being activated

by a lock operating device, penetrates into a respective, suitably shaped facing part attached to the above mentioned vertically protruding main body of the frame which penetrates into the front opening of the profile of the sliding door/window panel. This technique of locking does not provide a great degree of security as the lock can be forged by violent exertion of pressure at the locking area or by slightly raising the sliding door/window panel.

On the other hand, an external lock has been proposed consisting of an oblong hook profile attached onto a small plate at the external surface of the sliding door/window panel and pushed by a spring into a hooking position into a hook profile of the facing part which has a corresponding length and is attached onto the frame profile. This type of external lock may extend in length and hence provide for increased security, however causes an aesthetic degradation of the sliding door/window panel, due to the addition of the oblong hook profile in the external view of the assembly, whereas it is still possible (though far more difficult) to forge the lock by exerting pressure along the length of locking. Another disadvantage of this technique is that the lock comes automatically to the locking position as the sliding door/window panel is shut, due to the oppositely cut oblique cross section of the hook into the sliding door/window panel and the hook in the facing part, thus leading to undesired locking outside the space, e.g. outside, in the balcony, as the lock can only be disengaged from the interior side of the door/window panel.

The object of the present invention is to advantageously overcome the disadvantages and drawbacks of the prior art and to provide an internal lock for the sliding door/window panel, featuring the characteristics

of the abovementioned type of external lock, i.e. with the configuration of the oblong hook.

The present invention, however, presents an absolutely discrete and independent part of the hooking mechanism with a profile of an oblong hook and a respective facing part profile and a locking mechanism of the profile in locked position, wherein this division of the lock of the invention into two parts results in the hooking region being at a certain, predetermined distance from the locking region, thereby presenting an increased resistance should pressure be exerted for forging the lock, as the exertion of such pressure which may force the rotating profile of oblong hook to a rotation in a particular unhooking direction as exerted in the hooking region, however leads to the exertion of counter pressure towards rotation in a direction where the discrete locking mechanism acts.

Another object of the invention is to offer the ability of an automatically rotating profile of oblong hook, both when the sliding door/window panel is shut, as well as when it opens and comes to the unlocking position, thus eliminating the case of the user being undesirably locked outside the space intended to be locked by the lock assembly of the invention. This ability is effected with a special arm of the profile of oblong hook, which, when touching upon the frontal surface of the vertical element of the frame profile which penetrates the sliding door/window panel can operate as a lever initiating the rotation of the profile of the oblong hook either in the hooking direction or the opposite unhooking direction, whilst the sliding door/window panel moves in the locking or opening position respectively, without and interference of the user who only interferes in the process of activating the

abovementioned locking mechanism which maintains the lock in the locked position.

Another object of the invention is to offer a variety of design variations of the combination of the profile of the oblong hook inside the profile of the sliding door/window panel and of the profile of the facing part, either for one-sided locking with the rotating profile of the oblong hook fitted in one wall of the profile of the sliding door/window panel or for two-sided locking with a pair of profiles of oblong hooks fitted onto the two opposite walls of the profile of the sliding door/window panel. With the proposed solution of two-sided locking it is evident that the security offered by the lock increases.

Another object of the invention is to offer the ability of usage of independent profiles of plates, which can be attached both onto the internal walls of the sliding door/window panel profile, upon which the oblong hook profile can be attached and rotated so that the invention may be applied to a series of different door/window panel profiles which do not feature such a provision, as well as onto the facing part of the frame panel for meeting the operational requirements of the lock assembly of the invention.

Another object of the invention is to offer the ability of using alternative embodiments of locking (immobilising) mechanisms of the proposed lock assembly of an automatically rotating oblong hook in the locked position, amongst which there is proposed a locking mechanism which can convert easily and directly the direction of rotation of the locking tongue so that the same locking mechanism can be applied onto door/window panels sliding to the left or to the right.

Another object of the invention is to propose a sliding door/window panel profile, suitable for the

reception of the oblong hook and a corresponding frame profile suitable for shaping a correspondingly shaped receiving means of the facing part of the lock assembly of the invention, as well as the combination of such profiles of sliding door/window panel and frame profiles with alternative embodiments of locking (immobilising) mechanism of the proposed lock with automatically rotating oblong hook in the hooking position, where all the above form a new series of sliding aluminium profile panels, principally characterized by the automatic door/window panel opening and shutting.

These and other advantages, objectives and characteristics of the present inventions will become evident in the detailed description of particular preferred embodiments of the invention.

#### ***Brief Description of the Drawings***

The invention will be made apparent to those skilled in the art with reference to the accompanying Drawings, which illustrate the invention in an indicative, but not restricting manner.

Figs. 1a and 1b illustrate a cross sectional view of a typical combination of commercially available profiles of the frame of a door or window panel and of the facing part in the open and shut position, respectively.

Figs. 2a and 2b illustrate a cross sectional view of a typical conventional locking mechanism in a profile of the type of Fig. 1, where an external and internal lock is respectively used.

Fig. 3a illustrates a cross sectional view of a preferred embodiment of the profile of the oblong hook for the lock assembly of the invention with an indicative type of co-operating spring.

Fig. 3b illustrates a cross sectional view of a preferred embodiment of the profile of the facing part of

the lock assembly of the invention, which in effect consists of two grooves on either side of the protruding main part of the frame profile.

Fig. 3c illustrates a cross sectional view of a preferred embodiment of the sliding door/window panel frame profile, the side walls of which bear vertically extending cylindrical shafts for the reception of the oblong hook. In this Figure, the profile of the sliding door/window panel is illustrated cut in the region wherein a pad for determining the termination of the penetration of the facing part profiles into the sliding door/window panel.

Fig. 4a illustrates the lock of the invention assembled in the open position.

Fig. 4b illustrates the lock of the invention assembled in a position in between the open and shut positions.

Fig. 4c illustrates the lock of the invention in a shut position where the oblong hook is maintained fixedly locked by the locking mechanism.

Fig. 5 illustrates a perspective view of the profile of the sliding door/window panel where the lock of the invention is attached, and a respective frame profile with a vertically extending member bearing a suitable groove configuration for the reception of the hook of the lock assembly.

Figs. 6a, 6b, 6c illustrate a cross sectional view of alternative variations of combination of oblong hook profile and co-operating facing part according to an embodiment of the invention for one-sided locking.

Figs. 7a and 7b illustrate a cross sectional view of an indicative profile of oblong hook wherein both the cylindrical shaft for attaching the rotatable hook as well as the facing part constitute independent profiles

attached onto existing series of aluminium profile panels.

Figs. 8a and 8b illustrate alternative indicative embodiments of the profile of oblong hook according to an  
5 embodiment of the invention for one-sided locking.

Figs. 9a and 9b illustrate a lock arrangement according to an embodiment of the invention for two-sided locking.

Fig. 9c illustrates a variation of oblong hook co-  
10 operating with a variation of its cylindrical shaft of attachment.

Fig. 9d illustrates a cross sectional view of an indicative type of independent profile attachable to existing series of aluminium frame profiles, on the one  
15 hand for the cylindrical shaft of attachment of the rotating hook and on the other hand for the co-operating facing part bearing a groove for the reception of the hook in the case of two-sided locking.

Fig. 10a illustrates a view of an indicative  
20 preferred embodiment of the invention for the hooking mechanism of the hook and for locking the lock.

Fig. 10b illustrates the cross sectional view A-A of the mechanism illustrated in Fig. 10a.

Fig. 10c illustrates the cross sectional view B-B of  
25 the mechanism illustrated in Fig. 10a.

Fig. 10d illustrates a perspective view of the mechanism of Figs. 10 a, b, c, disassembled into its constituent parts.

Figs. 11a, 11b, 11c illustrate cross sectional views  
30 of alternative operating positions of the rotating locking tongue of the locking mechanism illustrated in Fig. 10d.



***Detailed description of preferred embodiments***

With reference to the accompanying Figures, indicative but not restricting embodiments of the invention will be described.

5 Fig. 1a illustrates a typical combination of profile 1 of a sliding door/window panel and in particular of the vertically extending part thereof at the side whereat the door/window panel opens or shuts, with a co-operating frame profile 2 containing the part 3 which, when the  
10 sliding door/window panel shuts, penetrates into the opening 7 of the profile 1, such opening being tightened by the brushes 7a and 7b on either side thereof.

The profile 1 comprises three discrete chambers, 4, 5 and 6 where the first chamber 4 is the one whereto at  
15 least one plastic pad 10 is fitted which determines the termination of penetration of the part 3 into the profile 1 as illustrated in the cross sectional view of Fig. 1b. In another horizontally directed cross sectional view as illustrated in Fig. 2a, the part 3 is attached to a  
20 facing part element 3a which takes the shape of the receiving means for the accommodation of a terminal part 9a which may have the form of a bolt, a tongue, a hook, etc. and is arranged at the end of the lock main body 9 which moves reciprocatively vertically, so that either  
25 the terminal part 9a penetrates into the facing part element 3a and the door/window panel locks or it is moved away from it and the door/window panel opens. This indicative type of lock is conventionally known as an inbuilt lock at the door/window panel, whereas Fig. 2b  
30 illustrates a variation of an external lock to the door/window panel 1.

In the case of an internal lock in the central chamber 5 of the profile 1, the lock is usually fitted with detachment of a suitable part on either side, so

that the lock mechanism can be introduced and is then covered externally with a cover plug means and internally with another cover plug means bearing a means for controlling the operation of the lock. Finally, in the  
5 terminal internal chamber 6 of the profile 1 of the door/window panel, an opening 8 exists through which the glass panel 11 or the shutter door/window panel is introduced into the profile 1 of the sliding door/window panel, this opening 8 being tightened by the elastic pads  
10 8a, 8b on either side of the glass panel.

The external to the sliding door/window panel 1, lock variation of Fig. 2b has the shape of an oblong hook 12 ending into a terminal hook 12a, whereas the facing part is another oblong profile 13 with a terminal hook 13a,  
15 independent of the main body 3 of the frame profile 2 which penetrates through the opening 7 into the profile 1 of the door/window panel. The oblong hook 12, apart from the main body at the end of which the hook 12a is provided, contains an oblong cylindrical body 14 with  
20 which it penetrates into a respective cylindrical plate frame 17 attached to the profile of the door/window panel 1, via screws 18, so that the hook 12 can be rotated inside the panel at the region provided for the penetration of the oblong cylindrical body 14 to the  
25 plate 17. The plate 17 also contains a cavity 19, within which a spring 20 is introduced, this spring being enclosed and compressed between the bottom of the cavity 19 of the plate 17 and one arm 15 of the profile of the hook 12 which finally extends into a terminal arm-handle  
30 16. As illustrated in Fig. 2b, the spring 20 extends so that it exerts pressure upon the profile of the hook 12 when the latter is at the "shut" position where the terminal hook 12a is coupled to the hook 13a of the facing part profile 13.

It is noted that this type of external lock with an oblong profile hook, comes automatically to the shut position, due to the inversely and obliquely cut of the ending of the hook 12a of the hook profile 12 and the hook 13a of the profile of the facing part 13, but the automatic conversion into unhooked position is not possible unless the handle 15 is pressed that temporarily compresses the spring 20 which is nested between the cavity 19 of the plate 17 and the wall 15 of the oblong hook profile 15. This operation, with the automatic and unwanted locking and the non-automatic conversion into unhooked position may lead to cases of locking the user in the space outside the surface of the door/window panel whereupon the lock is mounted. Furthermore, the overall construction of the lock with an oblong hook profile and additional respective oblong hook in the facing part, which protrudes from the sliding door/window panel and the frame, on one hand reduces the aesthetics of the frame and on the other hand is a significant operational disadvantage which limits applicability of the lock assembly as it is not possible to use this type of lock in the limited space between adjacent door/window panels which slide one next to each other (glass panel / shutter panel).

As mentioned hereinabove in the introductory part an object of this invention is to provide a lock for sliding aluminium door and window frames consisting of a profile of an oblong hook where hooking and unhooking operations are automatically effected and where the locking and unlocking operations from the hooking positions are performed purposely through a particular manual procedure. Simultaneously, the overall lock is built inside the profile of the sliding door/window panel and improves and eliminates aesthetic deformations and

limitations of the embodiment of conventional locks, also providing for increased security.

As illustrated in Fig. 3a, the oblong hook profile 21, according to an indicative preferred embodiment of the present invention contains a flat surface 22, at the ends of which recessions 22a, 22b are provided for seating and nesting the spring 20. At the inner end of the flat surface 22 and at the side of the recession 22a, a centre 27 is formed for the connection of the oblong hook profile 21 so that it can thereby be rotated. In the case illustrated in Fig. 3a, the centre 27 for the connection of the oblong hook profile 21 so that it can rotate is an open cylindrical cavity 27a.

Thus, on one side of the centre of the rotatable connection 27 the flat surface 22 for the reception and seating of the spring 20 extends, which ends to a terminal arm 26 which constitutes the immobilisation arm as it co-operates with a locking tongue 33 for elimination of the ability of the profile of the oblong hook 21 to rotate and for securing it at the locked position.

On the other end of the centre of the rotatable connection 27, the terminal arm 24 extends which constitutes the hooking arm, whereas between the terminal hooking arm 24 and the terminal immobilization arm 26, an arm 25 is provided which constitutes the means of activation of rotation of a certain arc length of the profile of the oblong hook 24, either in the direction of coupling of the hooking arm 24 to the recessions of the facing part when the sliding door/window panel shuts or in the direction of decoupling of the hooking arm 24 from the recession of the facing part, when the sliding door/window panel opens. Thus, the sliding/rotating arm 25 constitutes, as it is adjacent to the frontal surface 30 of the facing part, the lever for activating the

rotation of the oblong hook 21 in one or the other direction of rotation and renders the profile of the oblong hook 21 able to rotate automatically.

The profile of the oblong hook 21 is connected, as  
5 indicatively illustrated in Figs. 4a, 4b, 4c, onto a vertically extending flat surface 28 which protrudes vertically to the surface of at least one of the parallel walls 1a, 1b of the sliding door/window panel profile and has a length at least equivalent to the length of the  
10 profile of the oblong hook 21, whereas it bears a terminal shape of a centre of rotatable connection of the oblong hook profile.

A method to pivotally connect the profile of the oblong hook 21 onto the vertically extending surface 28  
15 of the wall 1a and 1b of the profile 1 is by the attachment of the terminal cylindrical shaft shaping 31 of the surface 28 to the similar in diameter reception groove 27a for the oblong hook profile 21. Alternatively, as illustrated in Fig. 9c, another method to pivotally  
20 connect the profile of the oblong hook 21 onto the vertically extending surface 28 of the wall of the profile 1 is by the attachment of a cylindrical shaft 27b of the profile of the oblong hook 21 to a cylindrical reception groove 31a which is the terminal shaping of the  
25 vertically extending surface 28 to the wall 1a and/or 1b of the profile 1.

Figs. 4a-4c illustrate and make evident the ability of rotation of the oblong hook profile 21, as the sliding/rotating arm 25 is adjacent to the frontal  
30 surface 30 of the facing part 3 which contains one groove or a pair thereof (30a and 30b) where a hooking arm may penetrate alternately, when the door/window panel is pulled into the shut position. In the shut position, as illustrated in Fig. 4c, it is possible by projecting the  
35 locking tongue 33, via an opening 32 to the separation

surface between the chambers 4 and 5 of the profile 1, to capture the end of the immobilization arm 26 so that the mechanism is kept in a locked position.

Fig. 4a illustrates the position of the rotating hook profile 21, when while unhooked, its rotation starts by the collision of the arm 25 at the frontal surface 30 of the facing part, and continues as illustrated in Fig. 4b (intermediate stage) for terminating in the hooking position as illustrated in Fig. 4c.

In the cross sectional view of Fig. 3c, a pad 34 is illustrated, not in the region of the extension of the oblong hook profile 21, but above or below it; the pad is illustrated in perspective in Fig. 5 and is attached to the profile 1 by the passing of the screw 35a via the hole 35 to a side surface, has the suitable cavity formation on either side of its frontal surface for being easily introduced via the vertically extending surfaces 28 at the walls 1a, 1b of the profile 1 and bears spring activated legs on either side 36a, 36b that contribute to its rigid adherence to the vertical walls 1a, 1b of the profile 1, on either side. The oblong hook profile 21 slides during its rotation onto the surface 37 of the pad element 34, whereas as evident from the comparison of Figs. 3c and 1b (where the respective pad 10 of the conventional technology is illustrated) the pad 34 of the present invention permits a significantly increased depth of penetration of the part 3 of the frame relative to the conventional technology and thus defines the contact surface of the vertically extending part 3 with the brushes on either side for tightening behind the one at least groove provided to it for the accommodation of the hook, thereby significantly increasing the feeling of security.

Fig. 6a illustrates a variation of the oblong hook profile 21 with the indicative addition of a reinforcing

rib 38 extending between the arms 25 and 26, whereas the facing part 3 is shown with just one single-sided groove 30a for penetration of the hooking arm 24. It is evident that such reinforcing ribs can be designed and applied to  
5 several other positions, arrangements and shapes for the reinforcement of the overall hooking profile 21.

Figs. 9a and 9b illustrate, in a hooking and unhooking position respectively, an arrangement of bilateral locking with an oblong hook profile 21 to each  
10 of the opposite parallel walls 1a, 1b of the profile 1, whereas the facing part profile 3 bears a pair of grooves 30a, 30b for the reception of the hooking arms 24 of the two opposite oblong hook profiles 21. The synchronized rotation of the two opposite oblong hook profiles 21 is  
15 evident, again with the co-operation of the sliding arms 25 with the front surface 30 of the main body of the facing part 3. It must be noted, that for evident space considerations, the differentiation in the design of the sliding/rotating arms 25 relative to those illustrated in  
20 the previous Figs. (e.g. Fig. 6a) which instead of having a curvature similar to that of the hooking arm 24, they have the opposite curvature, whereas the front surface 30 of the main body of the facing part 3, is also shaped with the same curvature.

25 Fig. 9d illustrates the ability to add independent additional profile elements 108 for developing two oppositely extending cylindrical shafts 101 for the reception of respective elements of a rotating hook 21, where the profile 108 has a generally rectangular cross  
30 section with a surface 103 adjacent to the surface in between the chambers 4, 5 of the profile 1 and surfaces 101, parallel, adjacent to the opposite side walls 1a, 1b of the profile 1. Respectively, an independent profile 43 is illustrated which can be adapted to an existing facing  
35 part 3 profile for the formation of suitable grooves 40a

and 40b for the reception of the hooking arms 24. With the addition of such independent profiles 108, 43 with any necessary technical variations, the embodiment of the idea of the invention into a series of frames, which do not feature the necessary elements for this purpose, is made possible.

Whereas the illustrated additional profiles 108, 43 are used for the embodiment of the invention for the production of a two sided-hooking lock, similar solutions are proposed for the one-sided hooking lock as well. As illustrated in Fig. 7a, the use of the additional profile 48 is possible for one-sided hooking, where the vertically extending flat surface 49 bears a terminal shaping of cylindrical shaft 41 for reception of the oblong hook profile 21 and is connected to the wall 1a or 1b via an angular part 42a-42b, one side of which is adjacent to the wall 1a or 1b and the other side is adjacent to the surface in between the chambers 4, 5 of profile 1. Similarly, the additional facing part element 43 follows the shape of the main part of the facing part 3 and forms a terminal groove 40a for the reception of the hooking arm 24 of the oblong hook profile 21.

It is evident that in any case, the embodiment of the above-mentioned interchange of cylindrical shaft and cylindrical reception groove in the centres of rotatable connection of the oblong hook profile 21 and the vertically extending surface 28 is possible.

According to a first indicative preferred embodiment of the invention, applicable to locks for one sided or two-sided locking with extending elements built into the walls 1a and/or 1b of the profile 1 protruding vertically, with terminal shaping of a centre for rotation permitting connection of the oblong hook profile(s) 21 or with additional independent elements for the development of such centres of rotation permitting



connection as disclosed above, the locking mechanism which captures the end(s) of the immobilization arms of the oblong hook profile(s) 21 and thus immobilizes in a hooking position one or two respective hooking arms 24 is a mechanism in chamber 5, located next to chamber 4 where the oblong hook profiles 21 are installed, which mechanism operates so that a locking tongue 33 protrudes when it takes the locking position, through an opening 32 in the surface in between the chambers 4-5, this locking tongue 33 capturing the rear part 26a of one or two immobilization arms 26 of the respective profiles of the longitudinal hook 21.

According to the first indicative preferred embodiment of the invention, the locking mechanism is presented in a development disassembled to the parts that constitute it in Fig. 10d, in an external view of the internal handle in the Fig. 10a, in a cross sectional view AA of Fig. 10b in Fig. 10c. As illustrated, the mechanism contains the following elements:

- 1) Main body of internal handle 60 which is fitted into an opening of the profile 1 in the region of the chamber 5 and contains a rectangular cavity 83 which is covered by a plastic cover 76 which features a central elevated part 77 and on either side of it the same-level blades 78 and 79, where the flat blade 78 moves reciprocatingly up and down, adjacent to the surface 84 which is located next to the opening 83.
- 2) The button 80 which consists of a rectangular surface 82 where a rectangular part 81 is provided onto one side of it, bearing recessions 81a on either side, through which it fastens to respective protrusions 78a, 79a under the central elevated part 77 of the plastic cover 76 and is built into it. On the other side of the rectangular surface

82, a pin 86 extends which is attached to a groove of the locking tongue 33.

3) A locking tongue 33 which contains a surface with a groove 91 in the form of a fork with legs 91a, 91b on either side, within which the pin 86 of the button 80 penetrate and a terminal hole 74 through which it is connected off-centre and so that it can rotate around a small shaft 72 of the main body of the internal handle 60.

4) Metallic or plastic cover 66, which contains a central elevated part 67 and same-level blades 68 and 69 on either side. The locking tongue 33 seats into the cavity formed in the region of the raised part 67. The locking tongue 33 is nailed, with a use of a nail along the small shaft 72, as the nail passes through the openings 67a of the elevated part 67. The same-level blades 68, 69 bear holes 68a, 69a respectively for being nailed to the nails 70a, 71a of the main body of the internal handle 60, and

5) Main body of the external handle 61 positioned into an opening of the profile 1, in the region of the chamber 5, exactly opposite the main body of the internal handle, and contains cylindrical tubes 63 on either side with an internal spiral, whereto a pair of screws 64 is nailed, these screws passing through holes 62 of the main body of the internal handle 60.

The locking mechanism of the oblong hook profile(s) 21 in the hooking position operates when the button 80, built into the plastic cover 76 reciprocates due to the reciprocation of the plastic cover itself; then the off-centre rotating locking tongue 33 is pushed, via the bolt 86 which tracks the specially curved track of one of the grooves 91a, 91b, for performing a certain arc length

rotation so as to protrude via the opening 32 to the surface in between the chamber 4 of the profile 1 where the hooking mechanism is installed and the chamber 5 of the profile 1 where the locking mechanism is installed.

5 In this manner, the hooking arm 24 of at least one oblong hook profile 21 is captured via the coupling of the terminal immobilization arm into the recession of the facing part.

According to yet another preferred embodiment of the  
10 invention, the same locking mechanism of the hooking arm 24 of at least one oblong hook profile 21 inside at least one suitably shaped recession of the facing part, may be similarly used for a sliding door/window panel which closes to the right or to the left, where the only  
15 necessary modification for the lock assembly to function either way is the assembly of the bolt 86 alternately to the right or left special curved groove track 91a or 91b of the locking tongue 33, so that the direction of rotation of a certain arc length performed by the locking  
20 tongue 33 is altered. The aforementioned only necessary modification may be effected with the overall locking mechanism assembled by a slight temporary raising of the blade 78 of the plastic cover 76, so that this is temporarily supported by an elevated surface 85, relative  
25 to the surface 84 onto which the blade 78 is operationally adjacent and in the vicinity of it, so that the bolt 86 is removed from one of the two legs of the pair of legs 91a or 91b, into which it has penetrated, and by tracing the top of the fork shaped groove 91 to  
30 enter again to the opposite leg of the pair of grooves 91a or 91b.

The operation of the locking tongue 33 which can be rotated on either side of the main body 60 of the locking mechanism is illustrated in Figs. 11a-11c, where in  
35 particular in Fig. 11a the locking tongue is illustrated

in a position aligned to the body 60 of the locking mechanism, whereat the tongue has retreated into the chamber 5 and does not protrude via the opening 32 of the surface in between the chambers 4-5 of the profile 1, in which case the oblong hook profiles 21 located into chamber 4 are freely rotated. In the position illustrated in Fig. 11b, the locking tongue 33 has rotated so that the terminal part of the immobilization arm 26 of the oblong hook profile(s) located at the chamber 4 of the profile 1 are able to rotate freely. In the position of Fig. 11b, the locking tongue 33 has been rotated so that the terminal part of the immobilization arm 26 of the oblong hook profile(s) 21 fitted to the chamber 4 of the profile 1, has been captured. Finally, in the position illustrated in Fig. 11c, the blade 78 of the plastic cover 76 and the pin 86 have been raised, passing from the top of the fork-shaped groove 91 and entering into the other side 91a of the groove for conversion of the same mechanism for operation with a sliding frame that shuts in the opposite direction than the one of the previous case.

It must be noted that the arc of rotation performed by the oblong hook profile 21 is in the order of 30 to 60 degrees and preferably 45 degrees.

According to an alternative, indicative embodiment of the invention, applicable to locks of the invention for one-sided hooking, with a vertically protruding extending element with terminal shaping as a centre for rotatable connection of the oblong hook 21 built into the wall 1a or 1b of the profile 1, or with an additional independent element for the creation of such centre of rotatable connection as described above and is illustrated in Figs. 7a and 7b, the locking mechanism which immobilizes the oblong hook profile 21 is a button 50 which, when pushed by the user into a reciprocating movement, inwards and

outwards, penetrates via the opening of the wall 1b of the profile 1 opposite to the wall 1a at which the oblong hook profile 21 is connected and able to rotate.

As illustrated in Figs. 6b and 6c, along with the  
5 aforesaid modification of the locking mechanism, the mechanism of the rotating oblong hook profile 21 is modified, which now contains a similar shaped hooking arm 24 which is followed by a sliding/rotating arm 25a in the internal side of which the flat surface 22 is provided  
10 with the recessions 22a, 22b on either side, whereupon seats the spring 20, whereas the immobilization arm 26a extends as an extension of the sliding/rotating arm 25a at an inclination in the order of 90 degrees.

This construction, as illustrated in Fig. 6c, can  
15 possibly capture the oblong hook profile 21 to a hooking position, when the button 50 enters inside the chamber 4 and touches upon the oblong hook profile 21 in the region at which the immobilization arm 26a and the sliding/rotating arm 25a meet.

20 According to a further alternative embodiment, as illustrated in Fig. 8a (unhooking position) and in Fig. 8b (hooking position), as an extension of the immobilization arm 26a, a back leg ending 39 is provided, extending vertically to it, which actually constitutes  
25 the immobilization arm, as during the rotation of the oblong hook profile 21 from the hooking to the unhooking position, it is displaced from the left to the right of the button 50 which is respectively pushed inwards or pulled outwards.

30 Fig. 7b illustrates an indicative embodiment of an additional part 48 for the formation of a centre for rotatable connection of the oblong hook profile as well as of an additional facing part element 43 for the embodiment of the idea of the invention to a series of

aluminium frame profiles that do not incorporate such characteristics.

It must hereby be noted that the description of the invention has been made by reference to indicative  
5 embodiments, which are however not restricting the scope of protection. Thus, any modification or alteration of the forms, dimensions, design, embodiments and combinations thereof of the totality or of individual  
10 elements of the proposed profiles, as long as it does not constitute a new inventive step and does not contribute towards the technical evolution of what is known, is considered to form part of the scope and aims of the present invention.

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**CLAIMS**

1) Lock assembly for sliding aluminium door/window frames applicable to a series of frame profiles which in the region where the door/window panel shuts incorporate a vertically extending protruding part (3) of the profile of the frame (2) which is introduced into a frontal opening (7) of vertically extending profile part (1) which consists of two parallel walls (1a, 1b) and ends to another rear opening (8) into which the glass or shutter door/window panel is attached, characterized by that it comprises:

A hooking mechanism for the engagement of a hook into a suitably shaped recession of a facing part which is automatically activated taking the position of engagement when the sliding door/window panel shuts, said vertically extending part (3) of the frame profile (2) bearing said frontal opening (7) in between the parallel walls (1a, 1b) of said vertically extending profile part (1) and being also deactivated automatically taking a disengagement position of said hook from said recession in said facing part when the sliding door/window panel opens and the said vertically extending part (3) bearing the suitably shaped said facing part recession is displaced through said frontal opening (7) of said profile (1), where such hooking mechanism features:

- At least one oblong hook profile (21) containing a flat surface (22) with recessions (22a, 22b) on either side thereof for seating/capturing a spring (20), a centre (27) for rotatable connection of the profile, a terminal hooking arm (24) into said

suitably shaped recession of the facing part,  
a terminal arm (26) for immobilizing said  
hooking arm (24) in the locked position and a  
sliding/rotating arm (25) which being  
5 adjacent to the frontal surface of said  
suitable facing part activates a rotation of  
a certain length of arc of said oblong hook  
profile (21), either in the direction of  
engagement of said hooking arm (24) into  
10 said recession of the facing part when the  
sliding door/window panel shuts or in the  
direction of disengagement of said hooking  
arm (24) from said recession of the facing  
part, when the sliding door/window panel  
15 opens, and

- At least one vertically extending flat  
surface protruding at right angles from the  
surface of at least one of said parallel  
walls (1a, 1b) of the profile (1) at a  
20 length corresponding to the length of said  
oblong hook profile (21) and bearing a  
terminal shaping of a centre for the  
rotatable connection of said oblong hook  
profile (21), and

25 A locking mechanism of said hooking arm (24)  
of at least one of said oblong hook profiles (21)  
inside said suitably shaped recession of the facing  
part, which contains a locking tongue (33) which  
when being activated via said locking mechanism,  
30 performs a rotation of a certain arc length and  
immobilizes said oblong hook profile (21) at a  
position in which said hooking arm (24) locks within  
said suitably shaped recession of the facing part,  
when it touches upon a terminal surface (26a) of  
35 said immobilization arm (26) as it protrudes via an



opening (32) at the surface separating chamber (4) of the profile (1) wherein said hooking mechanism is installed from chamber (5) of the profile (1) wherein said locking mechanism is installed.

5 2) Lock assembly for sliding aluminium door/window frames applicable to a series of frame profiles which in the region where the door/window panel shuts incorporate a vertically extending protruding part (3) of the profile of the frame (2) which is introduced into a frontal  
10 opening (7) of vertically extending profile part (1) which consists of two parallel walls (1a, 1b) and ends to another rear opening (8) into which the glass or shutter door/window panel is attached, characterized by that it comprises:

15 A hooking mechanism for hooking into a suitably shaped recession of a facing part which is automatically activated taking a position of engagement when the sliding door/window panel shuts, said vertically  
20 extending part (3) of the frame profile (2) bearing said suitably shaped facing part recession being introduced through said frontal opening (7) in between the parallel walls (1a, 1b) of said vertically extending  
25 profile part (1) and is also deactivated automatically taking a position of disengagement of said hook from said facing part recession when the sliding door/window panel opens and said vertically extending  
30 part (3) bearing the suitably shaped said recession of the facing part is displaced through said frontal opening (7) of said profile (1), wherein said hooking mechanism features:

- 5                   - An oblong hook profile (21) which features a centre (27) for rotatable connection of the profile, a terminal hooking arm (24) onto said suitably shaped recession of the facing part and an arm consisting of two parts (25a, 26a) which form a right angle, wherein inside the arm part (25a) a surface (22) is provided with recessions (22a, 22b) on
- 10                   either side thereof, said recessions (22a, 22b) constituting basements for seating of a spring (20), where the two parts of the arm (25a, 26a) form an immobilization arm (26a) of said hooking
- 15                   arm (24) in a locked position and a sliding/rotating arm (25a) which, when touching upon said frontal surface of said suitable facing part, activates a rotation of a certain arc length of said
- 20                   oblong hook profile (21), either in the direction of engagement of said hooking arm (24) with said recession of the facing part when the sliding door/window panel shuts or in the direction of
- 25                   disengagement of said hooking arm (24) from said recession of the facing part when the sliding door/window panel opens, and
- 30                   - At least one vertically extending flat surface protruding at right angles from the surface of at least one of said parallel walls (1a, 1b) of the profile (1) at a length corresponding to the length of said oblong hook profile (21) and bearing a terminal shaping of a
- 35

centre for the rotatable connection of said oblong hook profile (21), and

A locking mechanism of said hooking arm (24) of at least one of said oblong hook profiles (21) inside said suitably shaped recession of the facing part which contains a reciprocating button body (50) fitted into the chamber (5) of the profile (1) at this one of the walls of the pair of parallel walls (1a, 1b) of the profile (1) which is located opposite to the position of rotatable connection of said oblong hook profile (21) so that when it touches upon said arm (25a - 26a) or upon the rear ending (39) of the arm (26a), the button body (5a) captures said oblong hook profile (21) at the locked position with the hooking arm (24) inside said suitably shaped recession of the facing part.

3) Lock for sliding aluminium door/window panels according to the above claims 1 or 2, where the surface that bears a terminal shaping of a centre for rotatable connection of said oblong hook profile (21) is a surface (29) that extends vertically onto the wall (1a) and/or (1b) of said profile (1), said surface being an extension of the wall (1a) and/or (1b) and ending at a terminal shaping of a cylindrical shaft (31) for the reception of said oblong hook profile (21).

4) Lock for sliding aluminium door/window panels according to the above claims 1 or 2, wherein the surface that bears a terminal shaping of a centre for rotatable connection of said oblong hook profile (21) is a surface of an independent profile (48) in which a flat surface (49) extending vertically to it, bears a terminal shaping of a cylindrical shaft (41) for the reception of said

oblong hook profile (21) and is connected with an angular part (42a, 42b) to the wall (1a) and/or (1b) on one hand and to the surface (59) in between said chambers (4, 5) of said profile (1) on the other hand, respectively.

5 5) Lock for sliding aluminium door/window panels according to the above claims 1-4, wherein the rotatable connection of said oblong hook profile (21) onto the vertically extending flat surface of the parallel walls (1a, 1b) of the profile (1) is  
10 selectively effected either:

. By assembly of the cylindrical shaft protruding from the wall (1a and/or 1b) of the profile (1) or the cylindrical shaft (41) of the independent profile (48) to a  
15 respective in diameter cylindrical reception groove (27a) of said oblong hook profile, or

. By assembly of a cylindrical shaft (27b) of said oblong hook profile (21) onto a respective cylindrical reception frame (31a or 41a) of the wall (1a) and/or (1b) of  
20 said profile (1) or the independent profile (48) respectively.

6) Lock for sliding aluminium door/window panels according to the above claims 1-5, wherein said  
25 vertically protruding extending part (3) of the frame profile (2) bears at least one vertically extending groove (30a) between the terminal frontal surface (30) and the body of said part (3), where said groove (30a) receives said hooking arm (24) of an oblong hook  
30 profile (21) mounted onto one of the parallel walls (1a, 1b) of the said profile (1) of the sliding door/window panel.

7) Lock for sliding aluminium door/window panels according to the above claims 1-6, where a suitably  
35 shaped recession of facing part (40a) for single-sided

hooking or a pair of suitably shaped recessions of facing part (40a, 40b) for two-sided hooking are shaped at the end of an independent profile (43) which is attached externally to the surface of said protruding vertically extending part (3) of the frame profile (2).

5  
10  
15  
8) Lock for sliding aluminium door/windows door/window panels according to the above claim 1, wherein said protruding vertically extending part (3) of the frame profile (2) bears a pair of recessions (30a, 30b) on either side thereof, said recessions (30a, 30b) being adapted for the receipt of respective said hooking arms (24) of a pair of oblong hook profiles (21) fitted on either side, one in each of the parallel walls (1a, 1b) of said profile (1) of the sliding door/window panel, wherein each one of the oblong hook profiles (21) is connected to each one of the walls (1a, 1b) either:

- 20       ·     Into protrusions of the walls that end to a terminal cylindrical shaped shaft (31), or
- Into a terminal cylindrical shaft shaping (41) to vertically extending surfaces of independent profiles (48) on either side, connected to the walls (1a, 1b) and to the surface (59) in between said chambers (4, 5) of the profile (1) via angular joints (42a, 42b), or
- 25       ·     Into terminal cylindrical shaft shaping (101) on either side of vertically extending surfaces of an independent profile (108) which has a rectangular shape and is attached onto surface (105) on the one hand and onto the surface in between said chambers (4, 5) of the profile (1) and via opposite parallel surfaces
- 30

(102) to the opposite parallel walls (1a, 1b) of the profile (1) on the other hand.

9) Lock for sliding aluminium door/window panels according to the above claims 1 and 3-8, wherein said  
5 locking mechanism of said hooking arm (24) of at least one oblong hook profile (21) inside respectively at least one of said suitably shaped facing part recessions, contains:

10       • A Main body of internal cover plug means (60) which is fitted onto an opening of the profile (1) in the region of the chamber (5) and contains a rectangular cavity (83) which is covered by a plastic cover (76) which features a central elevated part (77) and on either  
15       side of it the same-level blades (78) and (79), wherein said flat blade (78) is reciprocatingly moving up and down, adjacent to the surface (84) which is located next to said opening (83).

20       • A button (80) which consists of a rectangular surface (82) wherein a rectangular part (81) is provided onto one side of it, bearing recessions (81a) on either side, through which it fastens to respective protrusions (78a,  
25       79a) under the central elevated part (77) of the plastic cover (76) and is built into it, wherein, on the other side of the rectangular surface (82), a pin (86) extends which is attached to a groove of the locking tongue  
30       (33),

      • A locking tongue (33) which contains a surface with a groove (91) in the form of a fork with legs (91a, 91b) on either side, within which is introduced said pin (86) of the button (80)  
35       and a terminal hole (74) through which it is

connected off-centre so that it can rotate around a small shaft (72) of the main body of the internal handle (60),

5 A metallic or plastic cover (66) which contains a central elevated part (67) and same-level blades (68 and 69) on either side, wherein the locking tongue (33) seats into the cavity formed in the region of the elevated part (67), wherein the locking tongue (33) is  
10 nailed by means of a nail along the small shaft (72), as the nail passes through the openings (67a) of the elevated part (67) and wherein the same-level blades (68, 69) bear holes (68a, 69a) respectively for being nailed  
15 onto nails (70a, 71a) of the main body of the internal handle (60), and

A main body of external cover plug means (61) positioned into an opening of the profile (1), in the region of the chamber (5), exactly  
20 opposite the main body of said internal cover plug means, which comprises cylindrical tubes (63) on either side thereof with an internal spiral, whereat a pair of screws (64) is nailed, these screws passing through holes  
25 (62) of the main body of the internal cover plug means (60) where:

- Due to the reciprocation of the plastic cover (76), the button (80), built into the plastic cover (76) reciprocates; then the  
30 off-centre rotating locking tongue (33) is pushed via the bolt (86) which tracks the specially curved track of one of the grooves (91a, 91b), for performing a rotation of a certain arc length so as to  
35 protrude via the opening (32) into the

surface (59) in between the chamber (4) of the profile (1) where the hooking mechanism is installed and the chamber (5) of the profile (1) where the locking mechanism is installed, thereby engaging the hooking arm (24) of at least one oblong hook profile (21) via the coupling of the terminal immobilization arm (26) into said recession of the facing part.

- 10 10) Lock for sliding aluminium door/window panels according to the above claim 9, wherein said locking mechanism of said hooking arm (24) of at least one oblong hook profile (21) inside, respectively, at least one said suitably shaped recession of the facing part may be similarly used for a sliding door/window panel that closes by moving to the left or to the right, wherein the only necessary modification is the attachment of said bolt (86) alternately, to the right or to the left specially curved groove track (91a, 91b) of the locking tongue (33) so that the direction of rotation along a certain length of arc that is performed by said locking tongue (33) is modified and wherein said only necessary modification can be effected with the overall locking mechanism assembled by means of a slight, temporary lifting of said blade (78) of the plastic cover (76) so that this is temporarily supported by an elevated surface (85) relative to the surface (84) onto which said blade is effectively adjacent and in the proximity of it, so that said bolt (86) is displaced from one leg of the pair of groove legs (91a, 91b) into which it has penetrated and tracing the top of the fork shaped groove (91) penetrates again into the other leg of the pair of groove legs (91a, 91b).



11) Lock for sliding aluminium door/window panels consisting of parallel walls (1a, 1b) which converge at one of their ends ending to grooves for the attachment of tightening brushes (7a, 7b) between which an opening (7) is defined and which converge at their other end ending to grooves for the attachment of elastic gaskets (8a, 8b) between which an opening (8) is defined wherein a glass panel (11) is applied and wherein the vertically extending part (3) of the frame profile (2) penetrates into said opening (7) when the sliding door/window panel shuts, characterized by that it contains in at least one of said walls (1a, 1b) at least one, vertically and at right angles to the walls extending, flat surface (29) with a terminal shaping either in the cylindrical shaft (31) shape for attachment inside a respective receiving recession (27a) of a similar diameter of said oblong hook profile (21) or a cylindrical receiving recession (31a) for accommodating a respective similar diameter cylindrical shaft (27b) of said oblong hook profile (21).

12) Frame profile (2) which contains at least one vertically extending part (3) which is arranged so that it penetrates into said opening (7) when a co-operating sliding door/window panel with profile (1) shuts according to the above claim 11, characterised by that said vertically extending part (3) bears a front terminal surface (30) with such shaping so that it defines a suitable automatic sliding and rotating process of said oblong hook profile (21) when said sliding/rotating arm (25) of the oblong hook profile (21) is adjacent to it, during the opening or shutting movement of the sliding door/window panel and by that said vertically protruding part (3) either bears a vertically extending groove (30a) between said terminal front surface (30) and the body of said part (3), wherein said groove (30a) is adapted so as

to receive said hooking arm (24) of one oblong hook profile (21) fitted into one of the parallel walls (1a, 1b) of the sliding door/window panel profile (1) in the case of one-sided locking or a pair of vertically  
5 extending grooves (30a, 30b) between said terminal frontal surface (30) and the body of said part (3), wherein said grooves (30a, 30b) respective receive said hooking arms (24) of a pair of oblong hook profiles (21) fitted onto opposite positions of each one of the  
10 parallel walls (1a, 1b) of the sliding door/window panel profile (1) in the case of two-sided locking.

13) Series of sliding door/window aluminium panels comprising a sliding door/window panel profile (1), a frame profile (2), a lock assembly with a discrete  
15 hooking mechanism of at least one automatically rotating oblong hook profile (21) and locking mechanism of said oblong hook profile (21) at a locked position according to any one of the above claims 1-12.

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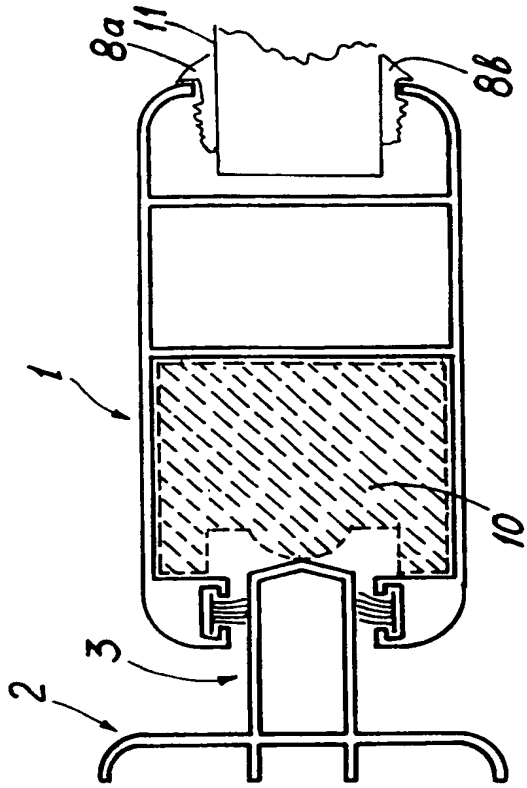


FIG. 18

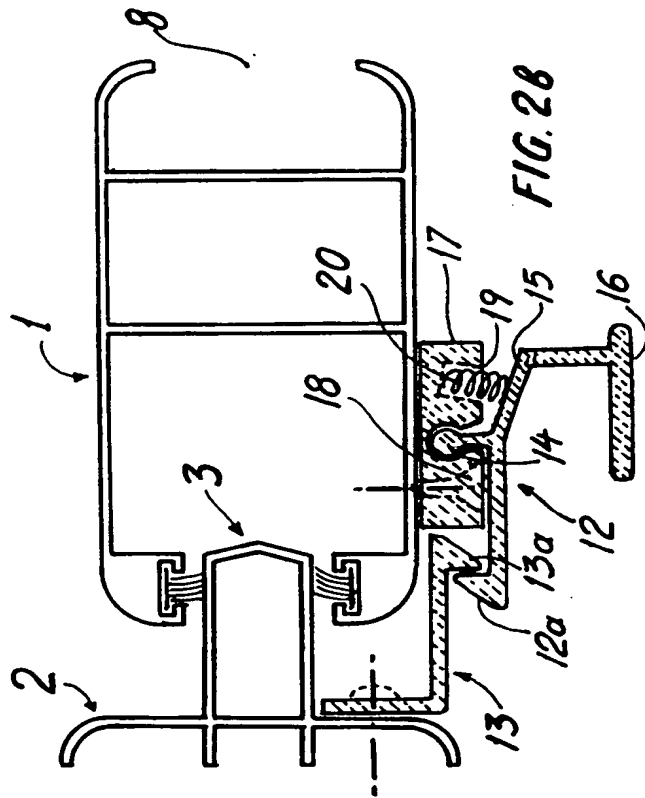


FIG. 28

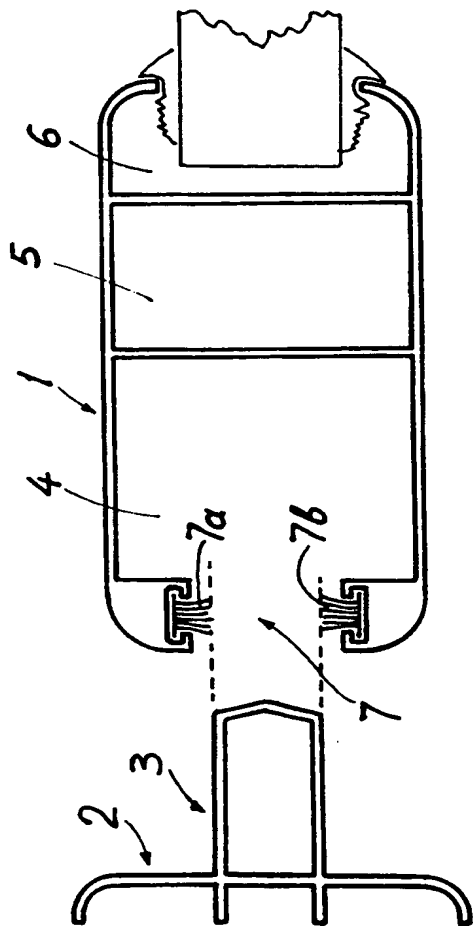


FIG. 1a

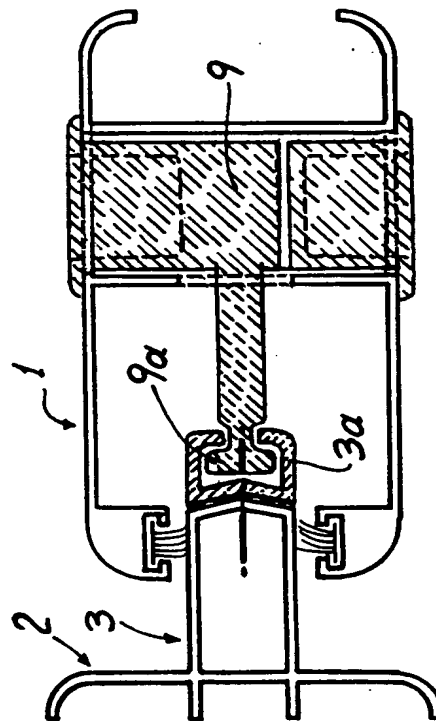


FIG. 2a

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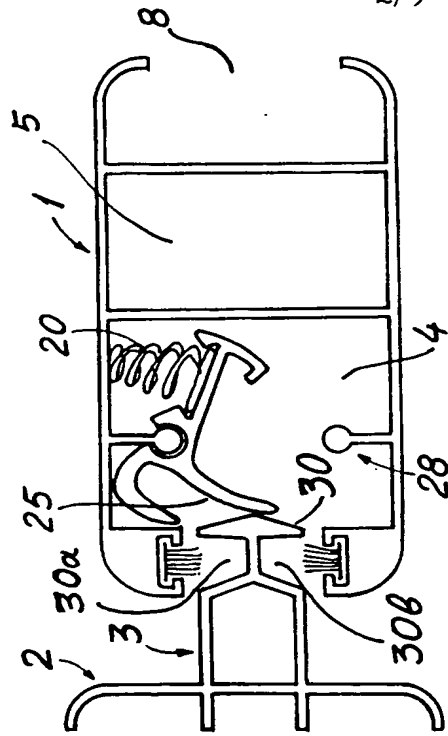


FIG. 4a

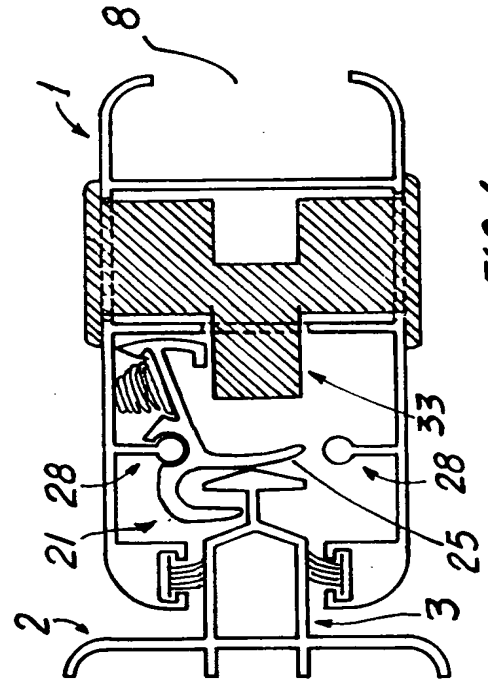


FIG. 4c

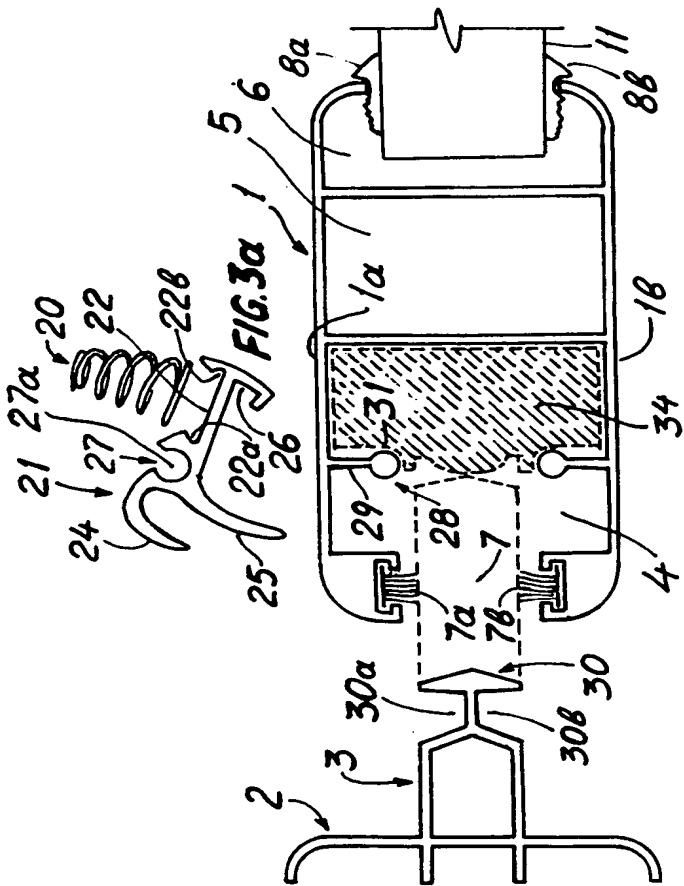


FIG. 3c

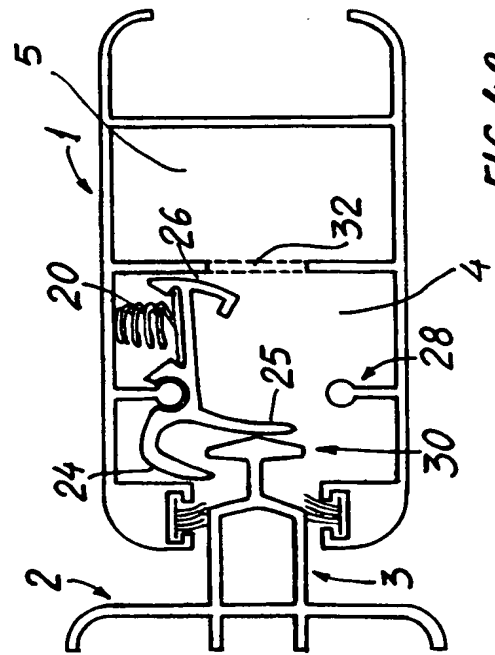
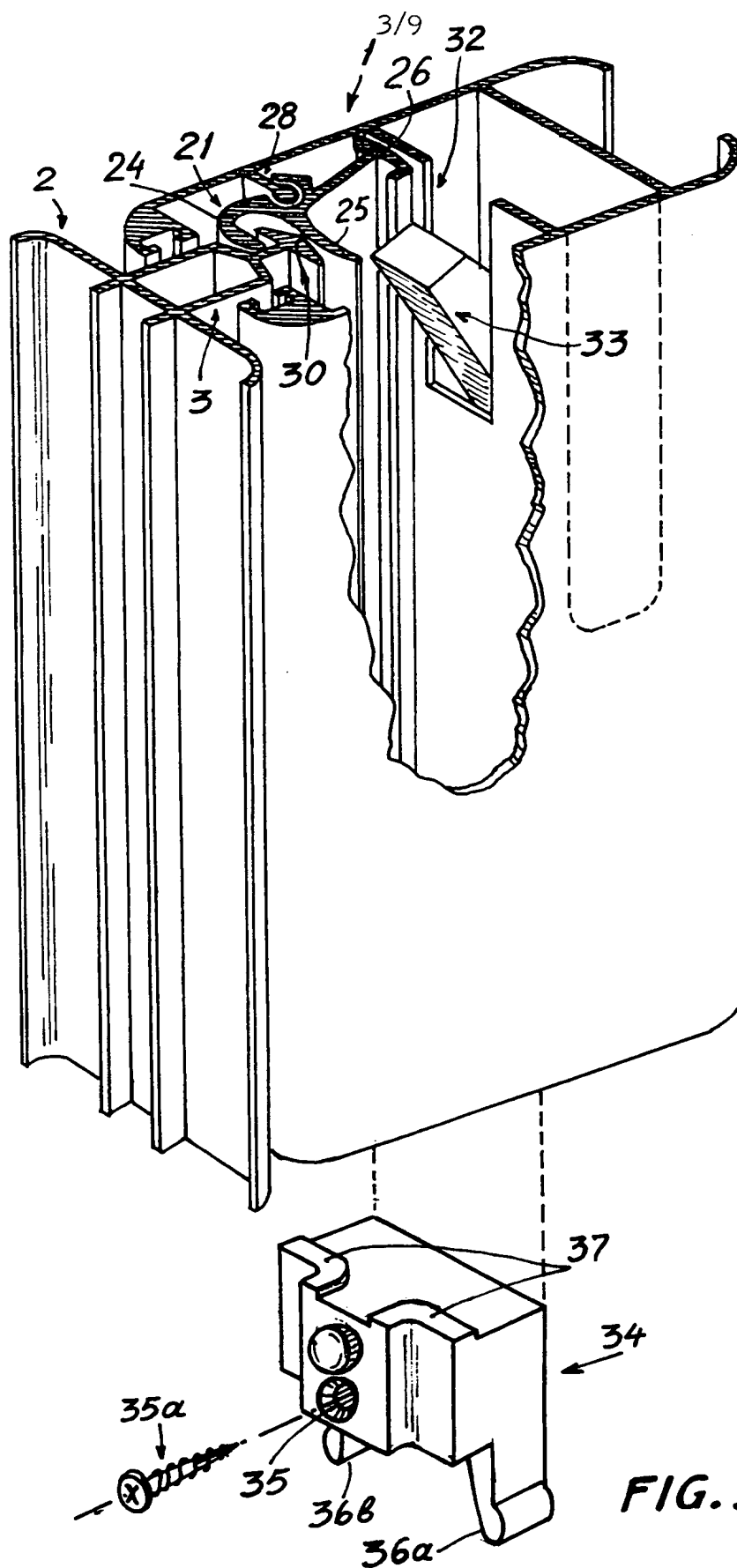


FIG. 4b



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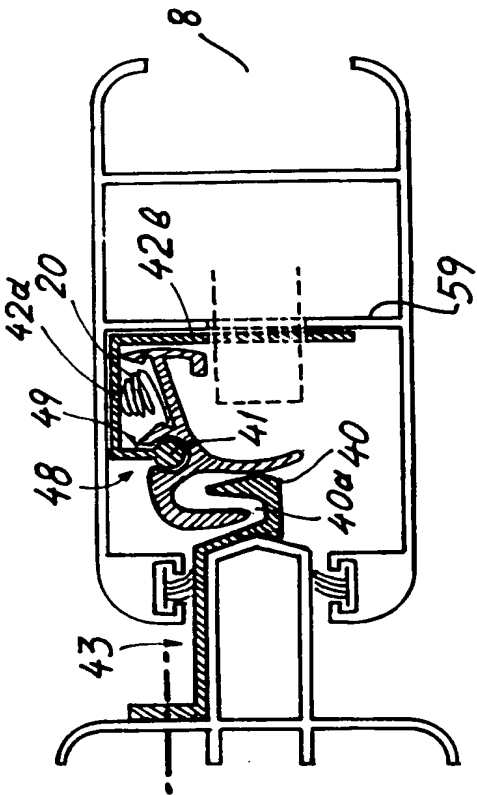


FIG. 7a

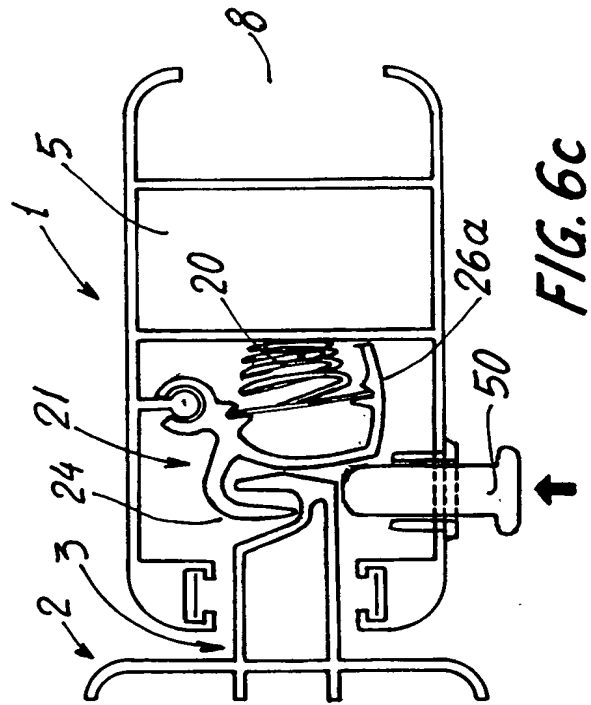


FIG. 6c

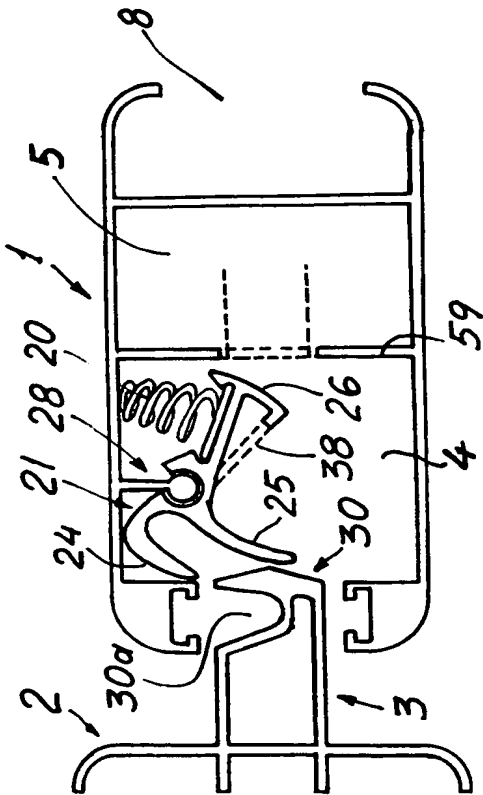


FIG. 6a

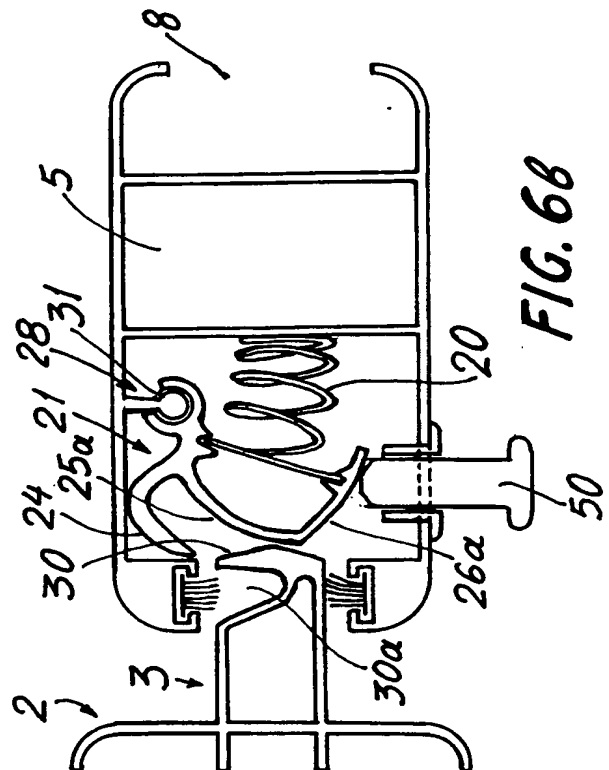
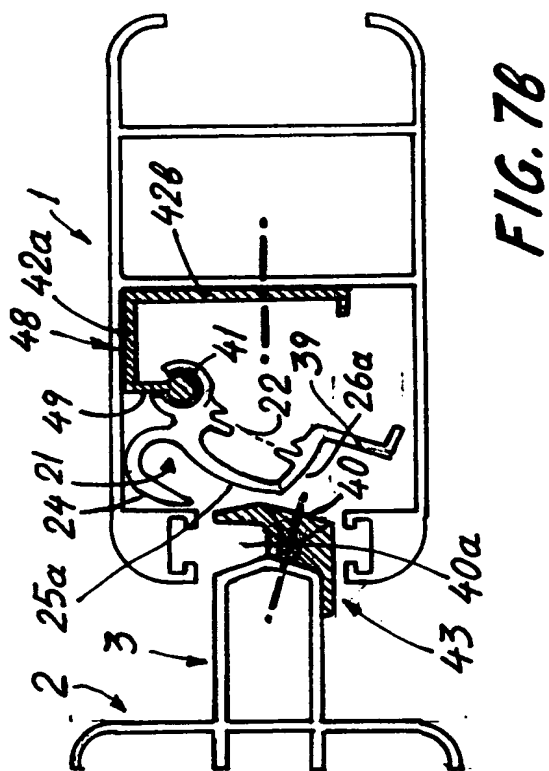
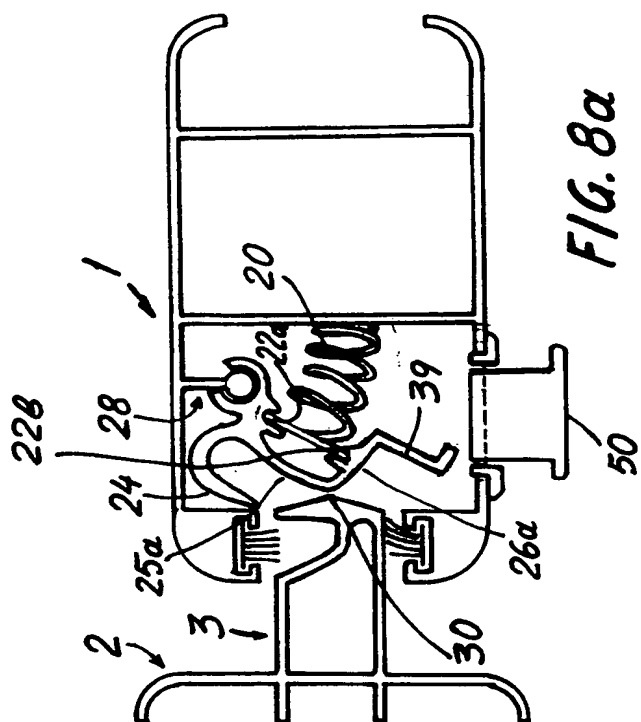
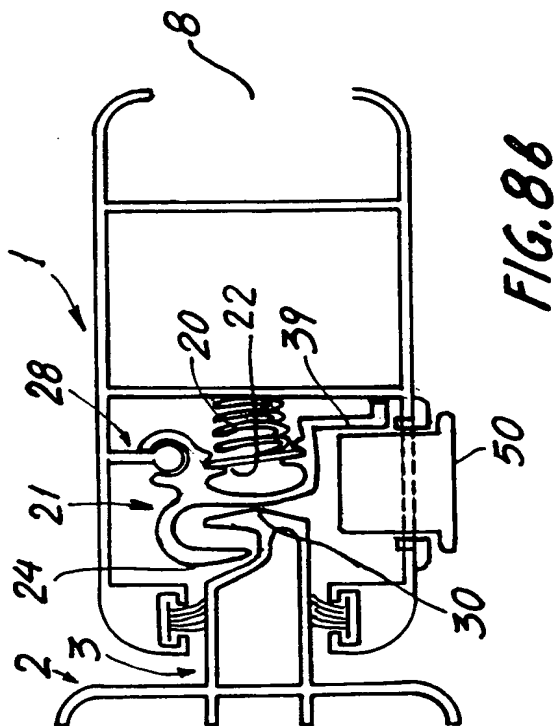
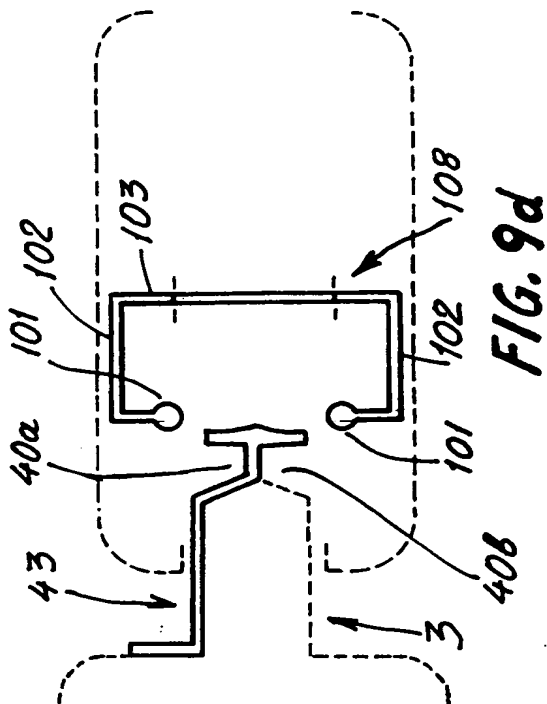
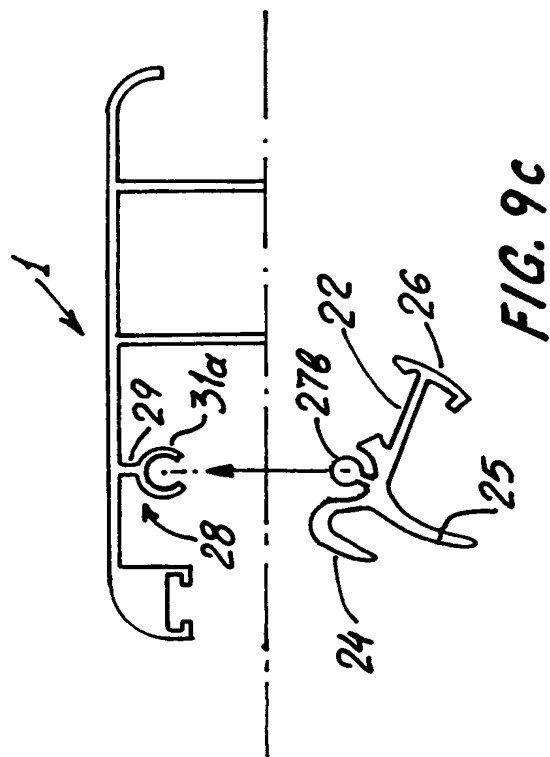
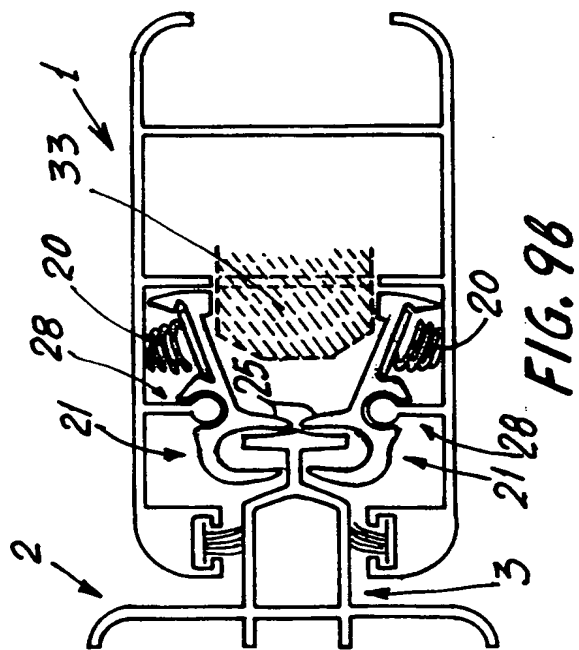
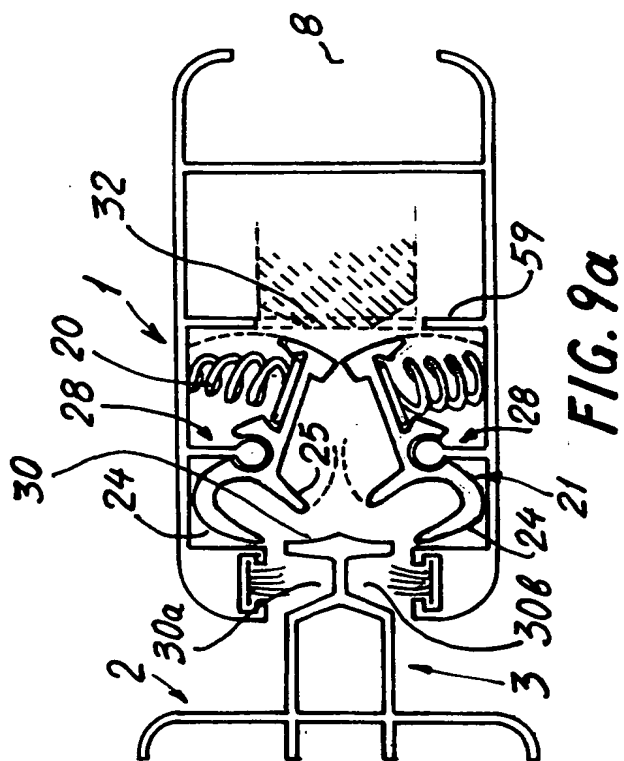


FIG. 6b

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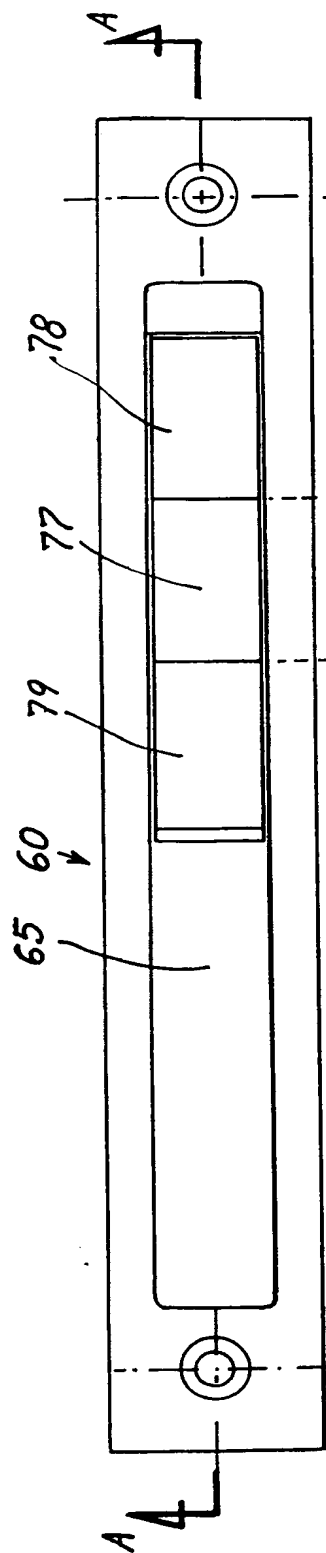


FIG. 10a

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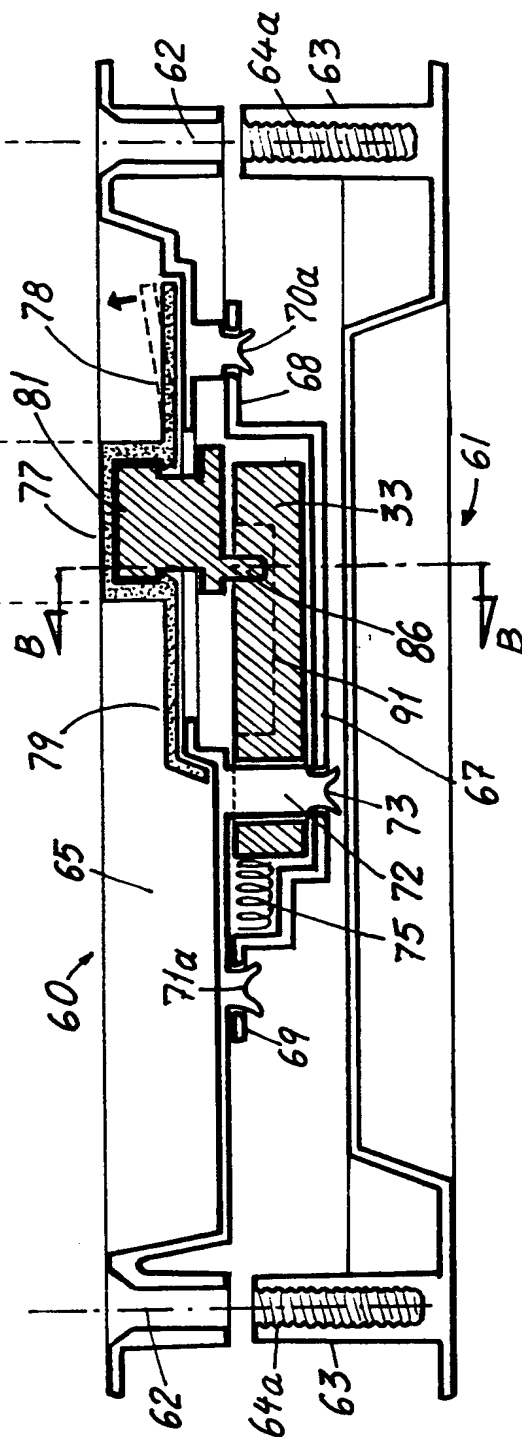


FIG. 10b

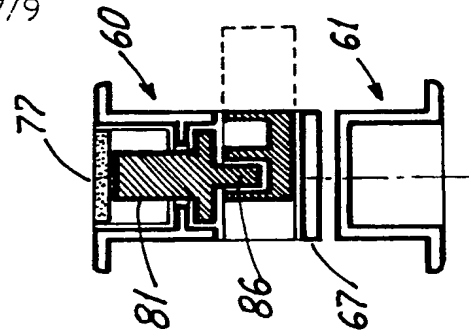


FIG. 10c

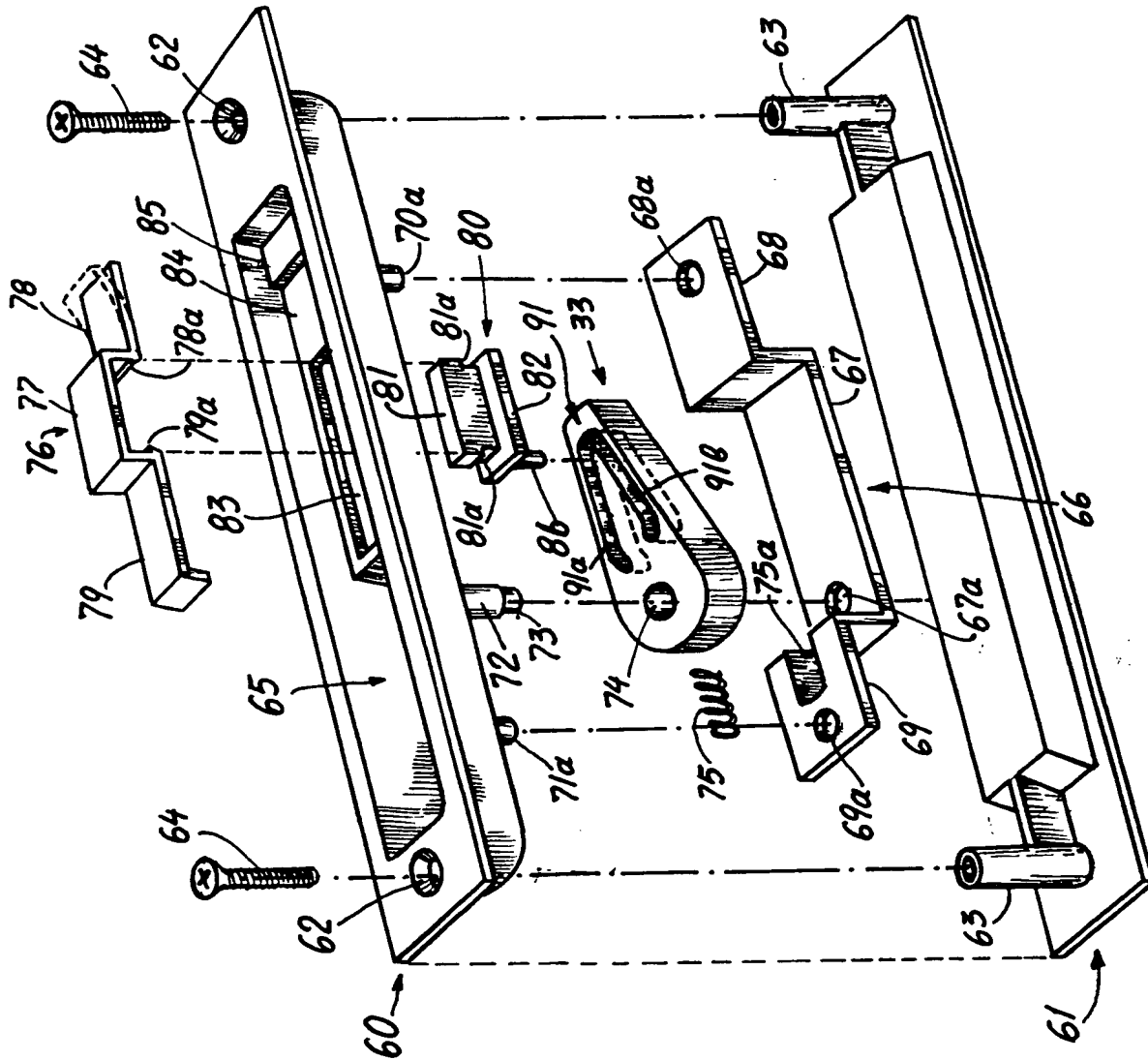
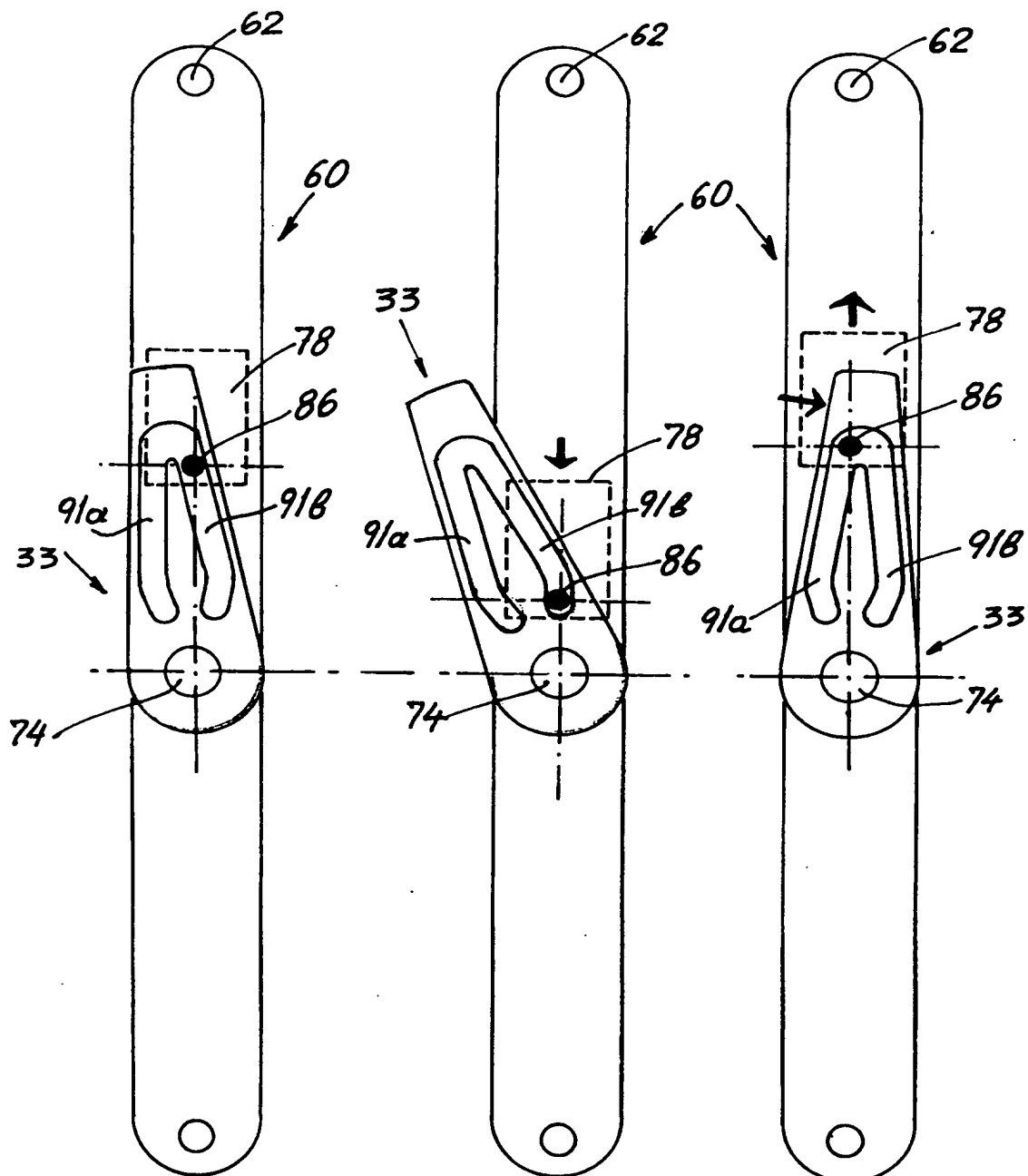


FIG. 10d

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**FIG. 11a****FIG. 11b****FIG. 11c**

# INTERNATIONAL SEARCH REPORT

Int. Application No.

PCT/GR 00/00023

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E05B65/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E05B E05C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 806 900 A (PRETE JAMES G ET AL) 15 September 1998 (1998-09-15) the whole document	1-13
A	US 4 995 649 A (MAGNUSSON CLAES) 26 February 1991 (1991-02-26) the whole document	1-13
A	FR 2 367 892 A (AUBIN PHILIPPE) 12 May 1978 (1978-05-12) the whole document	1-13
A	US 5 516 162 A (TAKAISHI OSAMU) 14 May 1996 (1996-05-14) the whole document	1-13

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

26 October 2000

Date of mailing of the international search report

07/11/2000

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

Int: 100 Application No

PCT/GR 00/00023

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